CARBON NANOTUBE ELECTRO-MECHANICAL OSCILLATOR

Youngsik Song and Jaewu Choi

5050 Anthony Wayne Dr. #3100

Electrical and Computer Engineering

Wayne State University

Detroit, MI 48202

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Abstract

Carbon nanotube is one of the best candidates for an essential component in nanoscale electromechanical systems. Tunable nanoscale resistors, capacitors, inductors, and mechanical resonators can be implemented with carbon nanotubes. It is originated from the excellent properties of carbon nanotube such as structure dependent metallic properties, pseudo-one-dimensional transport characteristics and electronic structure, hollow structure, extremely high mechanical strength with high aspect ratio, good thermal conductivity, chemical inertness, etc. In this study, we studied carbon nanotubes as an electromechanical oscillator from suspended carbon nanotube arrays. The suspended carbon nanotube arrays are fabricated by direct lateral growth of carbon nanotubes on the multilayer electrode arrays with a field effect transistor structure by thermal chemical vapor deposition method using C_2H_2 and Ar. The characteristics of carbon nanotube electromechanical oscillator are studied using an impedance analyzer as a function of frequency and gate voltage modulation.